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## THE ELY FEN-LAND.

By S. BARING-GOULD.

ONE of the most eloquent passages from the pen of the late Charles Kingsley is that in which, in his *Hermits*, he describes the condition of the vast Fen districts extending from Peterborough to the chalk hills of Cambridge, as it was before man took it in hand to drain it. He pictures the wondrous world of wild-fowl that hovered over the meres, the fish that swarmed in the waters, and the wealth of flowers that fringed the pools and floated on their glassy surface. But, beautiful as the Fen region was, it had its disadvantages: fish and fowl alike fed on insects; and mosquitoes, gadflies, and gnats swarmed there, rendering life insupportable to such as had not been born in the Fens, and whose skins had not become tough and rough with incessant stinging during the warm part of the year.

The beauty of the Fens is gone—it is Fen-land no longer. The water is drawn away, and the alluvial and peaty soil is the richest corn-land in England. And yet, here and there lingers something of charm. The dikes are still the homes of waterweed and flowers, and stand rank with yellow flag as strips of gold. In the lagoons that occupy old marl-pits still grows the water-soldier, a singular plant, that lies at the bottom of the water till flowering-time, when it rises to the surface, opens its pure white petals, and then sinks again. It is unlike any other plant we have in the British Isles, more resembling an aloe than any other. Its long stiff leaves are semi-pellucid, and are strangely toothed. It is found in the Rossal pits near Ely. The white-mallow is also to be seen in the Fens, and the blue water-forget-me-not and pink willow-herb abound. Moreover, on the water lie the golden flowers of the water-lily, locally called Brandy-balls. The yellow bog asphodel is not wanting; and the beautiful pale rose flowering rush, and the fair arrowhead with its three-petalled blossoms, adorn every dike.

Insects still abound. The gadfly is very poi-

ous, and lurks among the rushes. A man stung by one is incapacitated from work for two or three days. Here and there rise outcrops of white clay or marl from the dead level of the Fens, and these were formerly islets; their names end in 'ey,' the Norse for isle, as Ely—the Eel isle; Shipey—the Sheep isle; Thorney—the Thorn isle; Ramsey, Sawtrey, Stuntney, Welney, and the like.

The draining of the Fens was begun by the Romans; and Carr Dike—a drain extending from the Nene to the Witham—is attributed to them. But far more extensive operations were carried on by the monks and the Bishops of Ely. The drainage of the North Level was undertaken by Bishop Morton in the reign of Henry VII.; and he also dug a canal—called after him—a distance of forty miles, to carry off the overflows of the Nene. In the reign of James I., a Dutchman, Van Muyden, was summoned to undertake the task of the drainage; but the works were brought to a standstill under Charles I. by the Civil War. However, some good work was done. The Bedford Level—seventy feet wide and twenty miles long—took away the superfluous water of the Ouse in floods. Works went on under the House of Hanover, and the Fens were gradually improved; but the complete reclamation of the Fens was undertaken by the great engineer Rennie, and by others who followed him.

The system of drainage may be roughly described as this. Certain main arteries have been established, whereby the rivers Nene, Lark, Ouse, Cam, are carried between high banks to the sea. These banks are built up of chalk rubble and marl, and rise some fourteen feet above the level of the Fen. At distances of two miles, a steam-engine is planted on the bank, and pumps up the water from a 'load' or 'dike' into the main canal or river. These loads are at a considerably lower level than the canal. They are fed by the 'drains' which surround every field, and which are in connection. A windmill is placed at the point where all the water of a certain complex of drains reaches the bank of

the load or dike. The wind is rarely still on the Fens; and it is employed to pump the drain-water into the dikes. The machinery is extremely simple. The wind turns the sails, and they in their revolution set a huge axle in motion that runs from top to bottom of the fabric. At the bottom, by means of cogs, it sets a paddle-wheel in motion, which throws the water up an incline, for the drains are at a lower level than the dikes. The maintenance of the banks, engines, &c., is in the hands of Commissioners. These Commissioners are the landholders of the district and certain elected members. They impose the rates necessary, which amount on an average to six shillings per acre. The Commissioners maintain a body of men, 'bankers,' 'gaulters,' as well as horses and lighters, to keep the banks in repair; dredge the canals, dig the requisite clay, and keep the engines going.

Occasionally, in great rains all the efforts of man are unavailing to keep the Fens from being flooded. A flooded Fen causes serious damage, and takes years to recover. There is now living in the Ely Fen a couple of whom it is said that they settled to be man and wife when a flood swamped the cottage in which they were. Each had to take refuge on a chair and sit on the back with the feet on the seat. Thus they sat for hours looking at each other and waiting to be rescued. Before a boat came to take them off they had made a match of it.

The continuous pumping has dried the spongy 'turf'—that is, peat—to such an extent that the surface of the land has sunk six feet in the last fifty years. It has now ceased to sink, as the peat will no longer contract. The result of this sinking is that houses built half a century ago have their doorsteps a man's height above the level of the road. Moreover, the shrinkage of the land has left the few poor ash-trees that grew in the Fens standing above it on the points of their roots, and they are blown over unless artificially banked up.

The land recovered by drainage is of extraordinary richness; and when it does become somewhat exhausted by the crops grown on it, the restoration of fertility is easily and cheaply effected, for the best possible dressing is actually on the spot. Below the turf or peat, at a depth varying from five to ten feet, lies the clay, rich and greasy, like black butter. A farmer engages 'clayers' to dig down to the 'gault,' nine holes in a chain, and throw up the clay on the surface; for they receive about three shillings a day. The black butter is spread over the surface, and the dressing is done.

It is in digging these pits after clay that relics of a former age are found—flint weapons, bronze helmets, the tusks of wild-boars, and the horns of elks, sometimes the remains of a boat hewn out of one oak trunk. The former inhabitants of the Fen-land lived either on the islets, or upon platforms raised on piles above the water, precisely like the 'palafite' habitations of prehistoric times in the Swiss lakes, and like the crannogs of Scotland and Ireland. Indeed, this was the case down to the beginning of this century, and a drawing of one is in existence which was made about 1810. The house was wattled and of rushes; the roof had no chimney; the smoke of the fire found its way out through

the thatch as best it could. From the door a ladder led into the water, and at the foot of the ladder lay moored a flat-bottomed boat. Those who lived in these palafite dwellings picked up their subsistence by fishing and fowling, and cultivated a patch of land where left dry in summer. All the refuse of the house was thrown over the edge of the platform, and such heaps of refuse are found now when the plough turns up the soil, where formerly eels burrowed and ducks dived.

The inhabitants of the Fens have no peculiar dialect; their English is singularly good, with only a few peculiarities, as, 'I'm purely' for 'I am well,' 'I doubt' for 'I reckon,' 'frit' for 'frightened'; a 'boy' is a 'baw.' But the signs and names of the taverns are characteristic of the district. Such are 'Five Miles from Anywhere,' 'No Hurry,' 'The Fish and Duck,' 'The Spade and Becket,' 'The Sedgesheaf,' 'The Pike and Eel.' To give a salutation to any one is termed 'giving the seal of the day,' and one who has been overtired with work is described as being 'played upon.' Surnames are Goat, Chote, Spraggins, Gotobed, Tunkiss, Verlander, Gaultrip, Beames, Lavender, Cammell. Scriptural Christian names abound, but are oddly clipped; thus, Hezekiah becomes Ki, Ephraim is shortened into Pip; and the favourite Keren-happuch is squeezed into Kainie or Kenapue. The Fen men and women are a singularly silent, morose people, and there is little of laughter and play among the children. Unhappily, a great deal of opium is taken in the Fens, and the children are given 'poppy-tea' to keep them asleep when their mothers go out to weed in the fields. Every cottage garden has in it a bed of white poppy, and the consequence is that nervous disorders abound. The use of alcoholic drinks is also extensive in the Fens, and this is to a large extent explicable and excusable, for the Fen water is not potable, and there are no springs in the land. The Fen water is not only unpleasant in the taste and to the smell, but is also unwholesome. The Fen folk are obliged to have recourse to the river water or canal water, which is to a large extent derived from their own dikes and drains. There is no other to be had. Consequently, men and women, and even children, frequent the public-houses in a way not common in other parts of Great Britain. After harvest comes what is called the Horkey Feast, attended by entire households, and these too often degenerate into drunken brawls.

Every cottage garden grows celery, and that to a large extent, for celery is regarded as good against ague. Among the businesses pursued in the Fens is that of 'Gozard,' a goose-keeper; 'a Moler,' employed by the Commissioners to catch moles, which are greatly dreaded, lest they should bore their runs in the banks and let out the water. A 'Banker' is one engaged in keeping up the embankments; and a 'Gaulter' is one who digs in the clay-pits.

Favourite sports are 'dagging' for eels. An instrument locally termed a 'gleve' is made of four jagged knives tied together at the head of a pole. With this a man dags into the water of the dikes and drains, and very frequently brings up an eel writhing between the knives, unable to extricate itself. 'Trunding' for larks is

another sport ; it consists in drawing a net over the fields at night. As many as sixty dozen are captured at a time. Coursing is also in great favour. Hares are also caught in nets ; the Fen hares are fine creatures, and fetch from fifteen to eighteen shillings. They are sent to Kempton Park to be coursed. Hares when alarmed always run to 'holt.' The holt is the lowest portion of a field, that which is most marshy, and where willows and shrubs grow. There is the only cover to be found in this treeless level, where there is also neither heather nor gorse nor coppice. At Michaelmas is the statute fair at Ely, when farm-servants are engaged for the twelvemonth. The lads tie a band of straw round their legs, and this is taken off as soon as they have hired themselves to a master.

The tools employed in the Fens are peculiar : a 'hodden spade' is a spade that comes to a point ; a 'becket' is a long narrow spade with a piece of steel projecting from it at right angles. In going over marshy land, the men walk on stilts, or 'sketches' as they term them ; and in working in water, wear 'diking boots' that cover their legs to their thighs.

In winter the great sport is skating, but skates are called 'pattens.' Formerly, sledges were employed to run on the ice, fixed on two horses' leg-bones as runners ; and a bridegroom has thus run his bride to church to be married.

Horses used on a farm are not shod in the Fens, as there is no stone there ; and the roads, locally termed 'droves,' are unmade with stone. They are broad flat courses, with a ditch on each side ; they are sloughs in autumn, frozen hard in all their roughness in winter, and in summer are deep in impalpable dust. The only making they ever get is with a harrow drawn over them ; sometimes they are even ploughed, and then harrowed.

Owing to the Fens being a new land, the houses are all modern, and very ugly, of white brick. The cottages are sometimes of brick, sometimes of board, and thatched with rushes. All are built on piles driven into the peat ; and if the piles have been badly driven, the houses lean on one side and have cracks in them.

Most of the land belongs to yeomen, sons or grandsons of 'Fen slodgers,' men wise in their generation and shrewd, who bought up the soil as it was being drained, when speculators who had invested grew weary of the repeated calls on their pockets and despaired of seeing a return. These men, on the spot, saw their advantage, bought at very small prices ; and their sons and grandsons are now very wealthy. They are in many cases closely related to the workmen they employ, and they are not above turning up their sleeves and working with them, and harder than their best man.

The last scene in a farmer or labourer's career is certainly an impressive one. The largest wain on the estate is drawn forth, and the great farm-horses with black favours are harnessed to it. The coffin is placed in the wagon, and the mourners sit round on the wainboards. The horses, being unshod, step along almost noiselessly, but the bells on their necks tinkle. The labourers follow in lines along the drove, all silent.

There can be no graves in the Fens, for there

is no earth in which to lay the dead ; consequently, the funerals have to take place on some of the isles, and the distance gone is often many miles.

The Fen wains are very large, have a high front board, and are usually painted vermilion, sometimes with blue wheels. In this gaily-painted vehicle sit the mourners weeping, as the procession takes its tedious way. The black windmills radiating to the far horizon in lines, seem to form part of the convoy ; the Royston crows fluttering on all sides are in full harmony with the occasion ; and very usually the sky overhead is sombre and gray. A Fen funeral is a solemn sight, and is eminently picturesque, and the Fen folk seem to feel that it is impressive.

Strange is the power of home over the human heart. Such a country as the Fen-land, one would have supposed, could have exerted no fascination on an inhabitant, so lacking is it in every element of loveliness and cheerfulness and variety. Yet it is not so. A Fen-man hardly ever leaves the Fens ; and if by any chance one does get on to high ground, into undulating country, into woodland and rich green pastures by gliding serpentine rivers, he becomes sad ; a heartache wears him, and he is not at rest till he has returned to his flat Fen, which is chopped up into squares like a chessboard, and in which he may die, but cannot be buried.

#### THE BURDEN OF ISABEL.\*

##### CHAPTER XXI.—DANIEL'S INTERLUDE.

THAT telegram signed 'Daniel' demands full explanation. When George Suffield (the younger) received his uncle's request for a few weeks of Daniel's service, he congratulated himself, on the whole. Daniel was useful—Daniel was even valuable—but that singular encounter with Daniel in the clough, and that mysterious light in the counting-house—which still was unexplained—had made him doubt whether, after all, there might not be more in Daniel than met the eye. He was loth to commit himself to suspicion of Daniel ; so he welcomed the opportunity of being parted from Daniel for a time, so that he might turn his qualities over in his mind at leisure and consider whether he really ought to trust him or no.

As for Daniel himself, when Mister George told him that he must prepare at once to go to London to attend again for some weeks upon the Salib Raynor, he bowed with his hands upon his breast, saying : 'Respectable Mister George, I am obedient as the horse to the rein,' but he went out from Mister George's presence into the night and wept bitterly, flung his white turban on the ground and stamped on it, and then went indoors and packed his bag—and saw that a long knife in a sheath at the bottom of the bag was bright and sharp—and finally he sat down with his chin in his hand and his nails between his teeth and viciously thought. With regard to this journey, he complained, it was a great pity that it must be gone upon !—oh, a very great pity ! Just at the time when the things and the business,

etcetera, which he had set himself to do were beginning to look as if they really would get done, he was removed, taken away, banished! But he would come back! Oh yes! Yet what if the Sahib Raynor said: 'Daniel must stay with me; I need him?' (Daniel chewed his nails with the mere thought of it; for he had not got rid of the old impression that the Sahib Raynor had to be obeyed without question.) He knew, he saw clearly as in a glass, what he would be and do. He would make himself—oh yes!—a stupid person, to the end that the Sahib Raynor might be glad to be rid of him again! And in addition, he would make the Sahib Raynor endure things—yes, he would!—for taking him away from his purpose now and causing him to lose precious time, and perhaps opportunity!

George was very considerate with Daniel next morning, being half-ashamed of his sense of relief that Daniel was going. He carefully instructed him what he must do when he left the train in London in order to reach Rutland Gate without mishap or loss, and he wished to send some one to the station with him to see him off. But Daniel so earnestly protested that he could manage completely by himself, that he was allowed to depart with his bag alone. Had George followed him into the town, he would have understood why he was so resolved to go alone, and he might have seen further reason to be suspicious of his guilelessness.

Arrived in the town, Daniel took a round-about way to the railway station, walking with haste, lest he should lose his train. In a certain old square whose houses, formerly dwelt in by City magnates, were now become business offices, and whose door-jambs or pillars were plastered with the names of men of all nations—Parthians, Medes, and Elamites, and dwellers in Mesopotamia—he turned in at a door where was inscribed, among other names, 'TANDERJEE & Co., 2d Floor.' Up to the second floor Daniel lightly climbed, knocked at the door on the glass panel of which appeared 'Mr Tanderjee, Private,' and, without waiting for an invitation, entered. Mr Tanderjee sat at a writing-table, and his gleaming spectacles at once took in the significance of Daniel's appearance.

'A bag!' said he in English. 'You travel! You go away! What is this?' And he rose with a flourish of both his hands towards Daniel.

Daniel cast a hurried glance at the door of the other room, and answered in Tamil: 'It is to be deplored, O worshipper of the sun; but I must serve that I may rule. My former master needs me for a time, and my new master says: "Go. Peace be with you." And I must go: there is no help. But I will come again after not very many days—after, perhaps, another moon—and all will go well.'

Mr Tanderjee gently approached him with two ringed fingers spread in an expository fashion, and the two scoundrels faced each other and looked exceedingly respectable in their black alpaca coats. When they spoke, their tones were soft, which sounded uncanny, considering the quarrelsome matter of their conversation.

'It may be,' said he, also in Tamil, 'that all will go well. Yet, my son, consider. Gold-dust I will give much for, but brick-dust no man will buy. Things performed are to me as gold-

dust; promises are but brick-dust: you bring me, my son, only brick-dust.'

'You are unjust, O worshipper of the Lord of Light,' said Daniel. 'Have I not brought you and my wealthy, foolish master nearer together?—Am I not the strong link between you?'

'But the link goes,' said Tanderjee.

'The link will return,' said Daniel. 'Have no fear. And have you not benefited by his purchase of the cotton of India?—is there no gold-dust in that?'

'There is not much, my son. But where are the plans of the new—the precious, the beautiful—machines which are so jealously guarded? You do not bring them to me?' And there was an avid flash and glitter in the Parsee's spectacles.

'I did not find them when I looked. I was disturbed, and almost caught—as I have told you, O worshipper of the Lord of Light. But I cannot fail. I have my way of entering, which no man can guess—except it may be the old Guru, who is a seeker out of strange and secret things; and him will I cause to be sent away when I return.'

'When you return, my son! It is brick-dust, my son!' And Tanderjee in his eloquence made his two fingers flash and flutter before Daniel's eyes.

'Listen and understand, O Mr Tanderjee!' said Daniel, losing patience at last. 'The danger is all mine! I am as a man walking about through many dark doors, whose lintels are low: I may knock my head at any time. I am as the mattress on which you and Mr Gorgonio rest: it is the comfort of repose felt by the mattress? No, indeed!'

Daniel was turning away; but Tanderjee came before him and pressed him gently between his two outstretched hands.

'Behold, it is well. I did but try you, my son. We are brothers in this! But there is much to be done, ere the end arrives, and the time is uncertain. We are more than brothers! Behold, I bestow on you my ring.'

'Keep the ring, O worshipper of the Lord of Light,' said Daniel, 'until such time as I give you sufficient gold-dust to equal its value.—But the clock warns it is time that I go to the train.'

'Peace and prosperity go with you, my son,' said Tanderjee. 'Return with speed. I shall await you, as the mistress awaits her lover.'

So these two precious creatures parted; and Daniel went on to meet his late master.

Of the manner in which Daniel spent that evening in London we have had already some hint. Next day he set out with the Sahib Raynor on his fatal travels, taking charge of the familiar tent and other impediments which the Sahib insisted on carrying along with him. Daniel did not know where they set out where they were going; but the Sahib on the way to the station bought large maps of the south and west of England, paid a visit to his bank, and then took the train to Sittingbourne. Thence he hired a carriage and horses, and they were driven through the rich orchard-lands of Kent. Daniel found it difficult to carry out his design of showing himself 'a stupid person'; for by this mode of progression it fell to him to do little but sit beside his master and see that he was comfort-

able when they arrived at an hotel for the night. Moreover, his master was unusually silent and self-involved, and demanded little of him ; so self-involved and absent-minded, indeed, that he seemed frequently to wake up to wonder why Daniel was in his company. It was only in pitching the tent for the night—the Sahib always contrived to put up at some village inn or outlying hostel, attached to which was an orchard, or other private and secluded ground, where he could have his peculiar night arrangements—it was only then that Daniel could show himself awkward or stupid ; but yet his pains were lost, for Mr Raynor took no note of him.

Thus they drove on from day to day through all that lovely southern land, by the secluded 'dens' and 'hurts' of Kent and Eastern Sussex, where peace and primeval content dozed on lea and furrow, in village and homestead—dozed with the heavy soil and the patient red oxen, slowly dragging through the clay ungainly wagons encrusted with primeval mud ; by waving corn-field and breezy down, on into Hampshire and the New Forest, and so onward into the land of Arthurian romance. Everywhere as they passed, the 'swish' of the scythe or the 'birr' of the reaping-machine was in their ear ; the reaping was first of hay, then of barley, and then of oats ; and so they drove on, as in a panoramic dream, to the greatest reaping of all, when the Sahib himself was cut down. And the farther they went the more did the ravishing sweetness of Nature, the gentleness and docility of beasts, and the patient toil of men and women, impress the mind and soften the heart of Mr Raynor, till one night in the loneliness of his tent his hardness completely crumbled and melted ; he was suffused with tenderness as a man is suffused with blood when his heart breaks, and he wept as he thought of his brother and his niece. 'Women are far, far better than men !' he said to himself—unconsciously echoing a saying of his brother's uttered at about the same time ; and he turned there and then in his prompt, business-like way, lighted his candle, found paper and a pencil, and wrote to his niece : 'I have been altogether wrong about you and your father. Forgive me. We shall be happy yet together ;' and more to the same effect. Then he blew out his light, turned over and went to sleep, at peace with all the world—although it was written that he and his forgiven brother would never be 'happy together' again in this world.

In remarkable, wicked contrast with the blessed influence on Mr Raynor of the peace and sweetness of Nature was their effect on Daniel Trichopoly. Never was better illustrated the folly of those who would reform the knave and the rascal by turning them into the fields and woods to 'commune with Nature.' Nature never yet made the wicked man turn away from his wickedness. The wide-spread calm and content gave Daniel a certain enjoyment ; but yet they only served to make him more vicious, and more impatient to be back at the nefarious work to which he had set his hand. He was wroth that the Sahib Raynor was thus idly carrying him round the country, and it did not in the least appease his wrath that wherever they passed and wherever they stayed, his black face and white turban made him a more important and attractive

person than his master. It chafed him that no blunder, however egregious and however carefully planned, could provoke more than the mildest rebuke—the rebuke as of an indulgent father—and it amazed him, too ; for the Sahib Raynor had been wont to be sharp and severe in his discipline. And all the while Daniel could not do other than exhibit his usual suave and gentle demeanour ; the which he found to be such a constraint and repression of himself that it was necessary for him to relieve his impatience and rage by dancing round the Sahib's tent in the dark ; and then, if the Sahib heard and demanded 'Who is there ?' he fell down flat and slid away through the grass like a snake.

So the days and the weeks passed till towards the end of July when they were in Wales. The season—as I have already noted—was hot and dry beyond measure, but yet the Sahib insisted on walking far more in that land of mountain and stream than he had done anywhere else on the tour. He climbed Plinlimmon, and had a nasty fall down a rock ; but still he climbed and scrambled in sun and shade, followed by the polite Daniel, perspiring with resentment.

It was on the morning of the hottest day they had yet experienced that they were at Beddgelert preparing for the ascent of Snowdon. The baggage was to be sent on by the high-road to meet the Sahib at Llanberis ; and after a sufficient late breakfast, the Sahib, his servant, and a guide set out for the mountain, whose sides were quivering under the haze of heat. Of the three ascents of Snowdon it is well known that that from Beddgelert is the most difficult. It is doubly difficult on a sunny day ; for not only is the route long and dangerous, but, since it is directly from the south, the sun beats upon the traveller's spine the whole way, and the rocks throw back the glare and heat on the traveller's face. That day the ascent was terrible ; but Mr Raynor would not listen to the guide's suggestion that they should return and try again late in the afternoon or early next morning.

'It is absurd,' said he. 'I have felt hotter suns than this.'

So they laboured on in the terrific heat—now resting and panting in a scrap of shade, and now turning their hot backs to the sun again. About three o'clock, when they had accomplished about three-fourths of the ascent, and when the sun was beating most furiously on them, Mr Raynor suddenly reeled, pitched forward, and fell, as if shot. Both Daniel and the guide knew what had happened : the English sun had stricken down the old Indian traveller. If Daniel knew anything to do then for the recovery of his old master, he did nothing ; but he waited by him while the guide ran on to the summit for a litter, and when the litter was brought he helped the guide to carry him—all the while secretly elated that his wanderings were now likely to come to an end. At the hut known as *The Summit Hotel* there chanced to be a doctor. He at once examined Mr Raynor, and ordered that he should be carried down to Llanberis, he himself going with him, Daniel following, docile and attentive.

For the first time since he had returned to England, the traveller lay in a bed in a bedroom—lay completely still, and apparently unconscious.

Daniel sat by him the whole evening and night through, and the doctor looked in every now and then. There was nothing to be done but to watch and wait ; and Daniel watched and waited, afraid now, not so much of his old master, as of the shadow of Death. About midnight Daniel sat in silence, meditating in his half-pagan, semi-barbarous way on the strange facts of Life and Death, when the Sahib opened his eyes and looked at him.

‘Ah, Sahib !’ murmured Daniel, with his hands crossed on his breast. He continued in his Tamil : ‘Lord of many travels, and are you indeed turned back again from the door of the other world ? Is it a door that is hard to open ? *Kasi*, O master, is formed of but two letters, yet how many hours will it take to reach it ! And although a man may go to *Kasi*, he may miss his way to Heaven ! But a good man is fit to sit at meat with the gods. Therefore, O master, be of good cheer.’

Daniel ceased ; he perceived on the Sahib’s countenance what he interpreted as a demand for attention.

‘Ah,’ said Daniel, ‘and is the tongue stricken, as well as the limbs and the body, O master ?’

The Sahib looked pointedly at Daniel, and from him to a small locked valise on a chair, in which Daniel knew the traveller carried his papers, his journal or diary, and other property of an intimately private kind. Daniel laid his hand on the valise with a look of approval from his master, and, still with his approval, took the keys from his master’s pocket, selected the proper one, and opened the valise. He took out one thing after another, his master watching him the while, but giving no sign that the thing he wanted was reached until Daniel held in his hand the clasped volume in which the Sahib frequently wrote at night. Daniel held that up with a look of interrogation, and the Sahib gave a murmur of assent, and repeatedly tried to frame a word like ‘Isabel.’

‘Isabel ?’ queried Daniel ; and the Sahib assented and turned his eyes again on the valise.

Daniel returned to it, and continued to take out one thing and another, until he produced the Sahib’s pocket-book. The Sahib again murmured his assent. What did the Sahib wish to be done with it ? Something in particular to be taken out of it ? Daniel opened it, and his eye and hand first turned to some bank-notes. A third time the Sahib murmured assent, and seemed to frame the words ‘Wages’ and ‘Good.’

‘To me, O master ?’ inquired the astonished Daniel. ‘But you have paid me my wages—all except a very little ! And here, O master, are altogether five, ten—yea, fifty pounds !’

But the Sahib with insistence seemed to signify that the money was for him. Daniel with an agonised look of inquiry caught the bank-notes to his breast. The Sahib plainly assented to that, and with his eyes signified that he wished the pocket-book now to be returned to the valise. Then Daniel was overwhelmed for the moment with gratitude and shame : the Sahib thought he had behaved well, and the Sahib thus rewarded him ! The undeserved reward was too much for even Daniel. The Sahib had closed his eyes, but he opened them again.

‘Let me speak, O master,’ he cried, ‘words of thanks ! Your generosity, O master, is as the generosity of Karnan, the greatest of the seven princes ! And let me speak again, O master, but this time hear me not ! Shut the ears to my words ; for they are not good ! My heart has nursed anger ! I came with vinegar, and, behold, I bring away milk ! But the Sahib’s heart is noble as that of a king, and he rewards the undeserving ! I shall for ever remember the bounty of the Sahib !’

Daniel was silent ; for his master had again closed his eyes ; a deep flush overspread his face ; and he began to breathe very sterterously. Daniel glided swiftly to the door and called the doctor. The doctor came.

‘Ah,’ said he ; ‘effusion on the brain ! Poor gentleman !—And, I suppose,’ he added, looking at Daniel, ‘he has endured many fiercer suns than ours.’

#### PUZZLES FROM A DIAMOND MINE.

THE following paragraph appears in a South African paper : ‘At the “Premier” Mine a blast was put in about thirteen feet from the surface, and in the yellow ground some three feet below the limestone formation, which, upon being exploded, brought down, among the displaced diamondiferous soil, a perfect and full-sized ostrich egg. This wonderful discovery is apparently petrified, and evidently hollow, and must have been embedded in the ground for countless years ; and, without exception, is the most extraordinary find yet made in the history of diamond-mining.’

This is certainly a very curious discovery, but it does not stand alone, for ostrich eggs more or less perfect have been found both at De Beers and Colesberg Kopje in a fossilised condition. Large pieces of charred fossil wood have also been found from time to time, one of which is described as a portion of a fossil tree, four feet in length, and nearly five feet in circumference. This was found in Dutoitspan Mine, at a depth of eighty feet. At Kimberley there was dug up part of a stem of a tree with a branch attached, at a depth of three hundred and fifty feet from the surface ; and a still more singular find was an ant’s nest, quite perfect and undisturbed.

Another very remarkable fact is that more than once a broken diamond has been found, and at some distance from it the other portion, the two parts uniting perfectly. This was the case with the wonderful black diamond which forms a portion of the collection of Mr Streeter, the well-known Bond Street jeweller. The diamond referred to, which is said to be the largest black diamond known, was found in South Africa three or four years ago. It was in the form of half a pebble, and has been reduced by cutting from one hundred and sixty-nine and three-quarter carats to sixty-six carats’ weight ; and Mr Streeter has now secured the other half, which was found quite recently.

All these discoveries seem to militate against the generally received opinion as to the origin of these remarkable mines. As is pretty widely known, the diamond mines of South Africa, situated chiefly in Griqualand West, consist of

large depressions, filled with earth, varying in colour from yellow to gray and blue, which is described as a tough dry mud of volcanic origin, sometimes hardened into rock. This mud, or 'blue,' as it is technically called, is enclosed in a basin of rock geologically known as a 'pipe,' which is supposed to be a crater of an extinct volcano, into which the mud has been injected from below. The four principal pipes or mines lie within a radius of a few miles, and are known as Kimberley, De Beers, Dutoitspan, and Bultfontein. The general features of all are alike; in each, the upper part of the soil is yellow, changing, at from fifty to one hundred feet from the surface, to a blue ground of greater density. The diamonds were first discovered in the yellow earth; and when the miners had cleared that out, they imagined they had come to the end of the diamonds; but it was soon found that they were even more abundant in the blue ground; and since that time the mines have been carried down to six and eight hundred feet without any diminution in the yield; on the contrary, the deeper the excavations are carried the better appears the output.

The 'blue,' when excavated, is carried up and spread on the ground, where it lies for months, to be disintegrated by air and water, and is then washed and picked over carefully by hand to find the diamonds. Scattered through the blue earth are not only diamonds, but a great variety of crystals, agates, iron pyrites, and other substances, among which Mr A. A. Anderson, the traveller, believes he found many well-worked flint implements from different depths; and Mr M. E. Barber, as early as 1871, reported the discovery of many worn and perfect flint implements at Colesberg Kopje, in diamondiferous soil from considerable depths, which, if confirmed, would add another to the many puzzles connected with the diamond mines, especially if the volcanic theory is to be maintained. Mr Anderson, however, looks upon the blue ground as occupying the bed of an ancient lake, and that the diamonds, flint implements, fossil wood, and other substances—among which must be included a block of coal, and the ostrich egg alluded to at the beginning of this article—had been brought down by an ancient river, now represented by the Vaal, distant twelve miles or more, the bed of which at various points, and the rocky banks on both sides, are rich in diamonds, the rock of the river-bed being of the same nature as that which encloses the mines. Geologists generally incline to the volcanic theory, but believe that the diamonds are of an earlier date than the upheaval of the mud containing them from an enormous depth. It seems very hard to imagine a volcanic eruption of mud containing all the curious things found in the diamond mines, and especially the undisturbed ant's nest; and when we consider these and the various shapes and characters of the stones, the well-known fact that some have been split, the two halves remaining within a short distance of each other, whilst some have been welded together in an extraordinary manner, the puzzle increases.

The great majority of South African diamonds are amorphous, cloudy, yellowish-looking, soapy-feeling masses, varying in size from a pin's head to a small pebble; but some are perfect octa-

hedrons, white, and very brilliant. These are, of course, the most valuable; and, singular to relate, although these varieties occur in all the mines, yet the general characteristics of the gems, whether dull or brilliant, white or yellow, are sufficiently distinctive to enable an expert to say at a glance from which mine a diamond has come, the same holding good of the Vaal River gems, and of those from Jagersfontein, in the Orange Free State.

Here, then, is another puzzle. How is it that gems so apparently similar, having presumably a common origin and embedded in the same matrix, have acquired varying characteristics? Dame Nature is an adept at hiding her secrets even from the prying eyes of scientists, for although the diamond mines of South Africa have been known and worked for more than twenty years, scarcely anything has been added to our knowledge of the gem itself. The ancients called it Adamant, and we still regard it as the hardest of all things; yet it is easily smashed by a well-directed blow, can be cut in flakes by the dishonest jeweller, and is often found so cracked and flawed as to crumble to pieces untouched; nevertheless, the splinters will pierce the hardest rock, and even when reduced to the finest powder, will cut and polish all other gems.

Until the discovery of the South African mines, all diamonds came from India and Brazil; but it was of course the Indian mines which supplied the Old World; and, strange as it may seem, to our belief in the superiority of modern craftsmen, the jewellers of ancient India, and possibly of Rome also, had discovered the art of engraving and even of piercing the diamond, an art which our modern jewellers find most difficult.

Whatever may be the origin of the diamond, we have proof positive that this world of ours does not possess the monopoly of the lordly gem, for it has been found embedded in a meteorite coming from who can say what distant or disrupted world? Thus widely does Nature scatter her precious things; and we, who fondly believe she has favoured our little world above others, are informed by this messenger from space, that the things we covet are sown broadcast where, now at all events, there are no hands to delve for them and no eyes to revel in their beauty. Thousands, perhaps millions of years, the diamond has been in existence, yet its origin is still a mystery. Pure carbon, chemists call it, but in what alembic it is distilled they know not. Embedded in mud, it remains undefiled; yet sometimes it will be found tinted by some chemical process so as to become pink, blue, yellow, and even black; but it always remains a diamond, not to be confounded with the commoner crystals which often bear it company. In the Vaal River diggings it would seem to have a constant companion in a curiously streaked pebble, known as the 'bandoom,' which, when a digger finds, he knows that diamonds are near. In these diggings the gems are not found in 'blue' ground, as at Kimberley, but sometimes at a depth of from twenty to seventy feet in yellow ground, and under immense boulders, although often in shallow beds of fine red sand or under a hard crust of lime. The puzzle here, again, is to know how all these gems came there. In this case there is no question of upheaval from an unknown depth;

they would appear to be water-borne, and the mountains of the Drakensberg, from which the river takes its rise, might naturally be looked upon as their original home; but hitherto none have been found near the source of the river, and none beyond a certain point of its course, although they may be unearthed for a distance of seventy miles along its banks; and almost invariably, if found at one spot, they may be looked for immediately opposite on the other side of the river; so that geologists incline to the belief that they have been formed *in situ*—but how, when, and by what process, remain among the unsolved problems of science.

### THE RED-HOT NEEDLE.

#### CHAPTER III.

AMBROSE BURDON arrived in England in the middle of September, made his headquarters at a quiet boarding-house in one of the squares of Holborn, and at once hastened to call upon his cousin Ruth. The girl was astonished to find him in good spirits; and as he made no allusion to the events which had necessitated his return home, of course she did not touch upon the subject. Ruth and her aunts were delighted with him, for men of the world rarely broke in upon the solitude of their humble North London home, and Ambrose Burdon could play an agreeable, sociable part as well as any man, when he chose. As cigars were necessities of Burdon's life, and as Ruth's aunts abominated the scent of the weed, he and Ruth went out for a stroll together, and after an hour, during which time her cousin spoke pathetically of the bad luck which had overtaken him, and heartily of the good luck which had befallen her, she arrived at the conclusion that next to her own Jack, her cousin Ambrose was the nicest of men.

As for his resemblance to Felling, in the uncertain light of fading day, it was absolutely ridiculous, and more than once she had to look hard at him to persuade herself that it was he, and not Jack, who was walking beside her. That evening she went to meet Jack with her cousin. The greeting between the two men was hearty in the extreme; and at the grave risk of mortally offending her rigid aunts, Ruth dined with them at a fashionable West End restaurant, and only parted with them at her door as the clocks were striking midnight.

The two men walked home together; and the next evening Jack Felling told Ruth that all his original prejudice against Burdon was dispelled, and that he was really a first-rate fellow.

In a week's time Burdon came before the Directors of the Pacific Bank. The meeting was a long one. Burdon minutely explained all the circumstances connected with the Comprador's defalcations, and made out an excellent case for himself; but an example had to be made in the interests of the shareholders, and Ambrose Burdon received the intimation that six months' salary would be paid him, and that he henceforth ceased to be an officer of the bank. He bowed, and left the room.

September gave way to October, October waned into November. During this time the intercourse

between Ruth Tunstall, Jack Felling, and Ambrose Burdon was constant. They made excursions together; they visited places of public amusement together, and they frequently dined together. Jack Felling began to entertain so sincere a regard for Burdon, that he hardly regarded him as an intruder upon the sacred privacy of love-making, and Burdon had tact enough to know at once when there was no company, and never spoiled the evening tête-à-tête which the lovers still enjoyed.

It was now no secret that Ruth was an heiress, and so her engagement to Jack Felling was no longer withheld from the knowledge of her aunts; and in the bank it was known that at the New Year the headship of the Open Bill Department would be vacant. The marriage was arranged to take place in March; and already the young couple, always assisted by Ambrose Burdon, had plunged into the difficult and disappointing work of house-choosing. Indeed, Ambrose Burdon helped Ruth even more than did Jack, for his time was his own, and Jack of course was tied to the City, except upon Saturday afternoons. So little of a trouble did Burdon make of what had happened to him, that it was agreed that he must have saved and made money during his service in the East. At any rate, he said nothing about seeking for fresh employment: he dressed well, smoked good cigars, made free use of hansom, and in five cases out of six insisted upon being the host at the little dinners which the trio enjoyed together. All this he could easily do upon the six months' salary awarded him by the bank; but Ambrose Burdon was not the man to take no thought for the morrow.

So all went on smoothly and smilingly until the third week in November. Then the sunshine was blotted by a great and terrible cloud. Upon arrival at his lodgings one afternoon, Jack Felling found a telegram awaiting him. He tore it open, and read that Ruth had suddenly been seized with the symptoms of what was called influenza. He immediately hurried off to Dalston. The aunts met him with grave faces, and told him that although there were certain symptoms of the prevalent epidemic, such as the external feverishness and the internal chilliness, Ruth did not complain of the other symptoms usually present, but of a sharp, biting pain inside, which was quite foreign to the common malady. Moreover, she had been seized quite suddenly, and without any premonitory cold in the head.

Jack waited until the doctor came, and with him Ambrose Burdon. Jack had an unaccountable dislike and distrust of medical men, and when Dr Souter would say nothing and had no opinion to offer, growled that it was because he knew nothing about it.

'Do you mean to say, doctor,' said the young man, 'that you have no name to give to this attack?'

'I do mean to say so,' replied the doctor. 'All I can say is that there are grave symptoms which I cannot account for, and that unless they disappear before my treatment, I must call in a second opinion to share the responsibility of a case the like of which I have never known during an experience of thirty years.'

The next day there was no marked increase of the illness, but the symptoms for which the

doctor could not account remained. Poor Ruth suffered continual pain; but she bore it as often the most fragile of women can bear pain, her chief concern being for Jack, whose name was constantly on her lips.

On the third day she was, if not worse, at any rate so much the same that it was decided to call in a second opinion. The new doctor endorsed what Souter had said, and was utterly at a loss to account for the particular symptoms which were giving the patient so much trouble. Accidental poisoning was suggested; but the stomach pump and the usual tests failed to reveal the smallest trace of poison; and Ruth was accustomed to live so simply, that she could describe exactly what she had eaten and drunk for a week previously.

At the end of seven days she had wasted to but a shadow of her former self. The young men were constantly in attendance, Ambrose Burdon by day, Jack Felling by night, vying with each other in their devotion to the poor girl; and the Eastern acquaintances of the ex-bank Manager would have almost doubted their senses could they have seen with what tact and readiness the hard, unsympathetic man of business settled to the work of the sick-room. It was he who brought the daintiest flowers and the most tempting fruit. It was he who relieved the nurse, who went for the doctor, who performed errands, and who spoke words of comfort to the poor, frightened aunts, and lightened their sinking hearts with his quiet, cheerful talk.

'Old fellow,' said Jack Felling to him one evening, 'I'll never forget this kindness of yours; and if it should please God to spare my poor darling to me, our home shall be yours whenever you please.'

'Don't talk of thanks,' replied Burdon; 'but go out for a spin, or you'll break down. I'll stop here till you come back.' So Jack Felling, instead of relieving Burdon, went out, sorely against his will, and only in obedience to the conviction that seven nights' consecutive watching was beginning to tell upon him, and that the news of a break-down on his part would add to Ruth's trouble. He walked straight away for the old trysting-place at the City churchyard. It was getting dusk when he started, and by the time he reached Cannon Street it was almost dark. He turned down into the quiet of Upper Thames Street, and was on the point of ascending the steps leading up to the garden, when he felt a light touch on his arm. Turning round, he beheld a squat little figure, which at first seemed to be all hat and greatcoat.

'Well, my man,' he said, 'what is it?'

'Good-evening, sir; I welly glad to see you,' was the reply.

'I don't know who you are,' said Jack. 'What do you want?'

'You no sabby my!' exclaimed the little man, and, turning his face towards the gas-lamp, showed the grinning features of an unmistakable Chinaman. 'Now you sabby my!—you sabby Ah Why—and you sabby welly well that Led-hot Needle!'

'Ah Why!—Led-hot Needle! What the deuce are you jabbering about?'

'Maskee, sir, maskee! Ah Why sabby you, if you no sabby Ah Why,' said the Chinaman.

In a moment it flashed across Jack's mind that he was being mistaken for Ambrose Burdon, and that this man could be no other than the defaulting Comprador after whom such fruitless search had been made. He was on the point of discovering himself to Ah Why, when it occurred to him that this Mr Ah Why seemed to be upon extraordinarily familiar terms with one whom he had caused to be turned out of the bank's service; that he was hardly playing the part of a fugitive from justice in general, and from an injured man in particular, and that he must be in London with some object.

So he determined to dissemble for a while. 'Oh! You're Ah Why the Comprador!' he said. 'Well! what on earth are you doing in London?' 'I wantchee see you, sir,' replied the Chinaman. 'That police mens have makee hunt me all sides—Hong-kong, Singapore, Penang—no side be long safe. I read that money offered for me by the bank all sides. Then I go that Manila side: I makee lose allo my money, and I come to England as cook's mate in a ship.'

'Serve you right! And now I suppose you want me to help you?'

'Yes, sir. You 'member that Led-hot Needle?'

'What?'

'That Led-hot Needle.'

'What do you mean? Speak plainly. What the dickens do I know about a Led-hot Needle?'

'Ah! I tink you no wantchee 'member it, sir—you no wantchee 'member it; here he sank his voice to a whisper. 'Pelaps that Led-hot Needle have makee you lich man, and you no likee 'member it.'

There was an almost diabolical twinkle in the bead-like eyes of the Chinaman as he said this. Jack was thoroughly puzzled; but from what he could make of a language to which he was unaccustomed, it seemed to him that there had been some sort of private understanding between Ambrose Burdon and his Comprador. So he resolved to keep on his mask.

'Really, Ah Why,' he said, 'my memory must have been affected by that affair at the bank. What did I want this Red-hot Needle for? I quite forgot.'

'Hush!' said the Chinaman fearfully. 'Man no talkee about it loud. That day when you makee find out about the forged cheques, you talkee my: "Ah Why, you sabby one thing can makee my lich man. I mean that Led-hot Needle. Supposee you get my that Led-hot Needle, I let you get away that China side before that policeman catchee you." Now you 'member?'

'Yes, yes; now I remember!' replied Jack eagerly. 'Well?'

'Well, I give you one piecey chit to my cousin, Dr Quang Ti, and he give you that Led-hot Needle, and now I can secure you be long lich man.'

'That fool Burdon's been dabbling in charms, that's evident,' thought Jack. Then he said aloud: 'Well, I can't say that I am a rich man.'

'No!' exclaimed Ah Why. 'Pelaps you not makee use it all light. I talkee you, Mr Burdon, that Led-hot Needle never miss. Some time it take one moon, sometime two moon, sometime tlee moon—but it never miss.'

'Then how is it you are not rich?' asked Jack.

'Oh! that belong other thing,' replied Ah Why. 'Chinaman no makee usee welly often. Chinaman dare not. Beside, I have no piecey man or woman to makee my lich. Suppose I have one piecey welly lich uncle, and he can makee my lich, and he no makee, then pelaps'—

'Well,' said Jack, 'here's half-a-sovereign for you. Where can I find you if I want you?'

'Sailor-man Home, Well Street,' replied Ah Why. 'Tank you, sir, welly much. I hope I see you again.' So saying he saluted, and disappeared in the darkness.

It would be difficult to describe the state of mind in which Jack found himself after this interview with the ex-Comprador of the Pacific Bank; for, from what the latter had said in the fullness of his belief that he was talking to his late Manager, it was clear to Jack Felling that this man, Ambrose Burdon, who had won his heart by his attention to poor Ruth, had been criminally connected with the robbery. The theory he patched together as he walked on through the dark streets was this: He knew Ambrose Burdon to be a paradox—a keen, clever business man, and yet superstitious to an unusual degree in a practical age. It was clear that he had lost money, probably through speculations in which he and the Comprador had worked together—a by no means uncommon kind of partnership in the Far East. Matters must have come to a desperate pass, and an arrangement had evidently been made of mutual advantage to both parties: the Manager to screen the Comprador from the consequences of his peculations; the Comprador to put the Englishman in possession of the means of becoming rich—means veiled under the mystic name of the Red-hot Needle.

Of the nature of this strangely titled key to wealth Jack Felling of course could form no idea. He scouted as ridiculous and impossible the notion of a century-end business man, even if he was superstitious in such matters as sitting down thirteen to table, passing under ladders, crossing knives, spilling salt, and so forth, believing in the magic influence of anything like the Philosopher's Stone; but he saw in the name of Red-hot Needle the symbol of a power, and, from the hushed way in which Ah Why spoke of it, a terrible power. Jack Felling, who was brought constantly in contact with men who had passed long years in China, of course had picked up a large fund of various information concerning that country, and about one subject in particular, the Secret Societies, he was well conversant. Now, it struck him that, in a desperate plight, Ambrose Burdon might have put himself in communication, through Ah Why, with one of these societies, the chief object of which was to levy blackmail on the rich, and that the talisman, or passkey, had been this so-called Red-hot Needle; and he was supported in his notion that Burdon had done this, and that he had done it with success, by the strangely composed manner in which he had accepted his dismissal from the bank, and by his evidently easy pecuniary position.

So interested and absorbed had Jack Felling become in the extraordinary discoveries of the

evening, that he, for the time being, almost forgot about his poor suffering darling at Dalston; so, pulling himself out of his reverie, he walked sharply to the Broad Street Station. There was a man opposite to Jack in the railway carriage who was reading an evening paper. As he held the sheet so that one side of it was fully displayed, Jack found himself trying to spell out the items of news in the dim light. Suddenly his eyes became riveted on a paragraph headed: 'Strange Affair in Paris. The Chinaman and the Russian General.' So eagerly did he read it, that the owner of the paper, noticing him, asked him if he would like to see it.

Jack stammered out an apology for his rudeness, but declined the offer. He had read in that short paragraph what made him feel sick and faint, what made him fume at each stoppage of the train, what made him leap from the carriage when it was in swift movement at Dalston Station, fall heavily, pick himself up unconscious of bruise or sprain, rush past the ticket collector, and speed as he had never sped for many a day straight to the house of sickness.

That paragraph had given him a clue about the Red-hot Needle.

#### ARMY BAKERY.

THE provisioning of an Army is, of course, a matter of primary importance, and it is imperative that the arrangements for so doing should be such that, in whatever circumstances the army may be placed, and no matter where it may be located, it may never be without a sufficient supply. A separate branch of the service, the Commissariat Department, is set apart to attend to these arrangements entirely; and with them depends, to a great extent, the efficiency of an army when in the field, as well as its health and comfort when at home. This department is responsible that the supply of provisions both for men and horses is sufficient and regular, and also that these provisions are sound and of good quality; and it may be of interest to know how this is carried out. It is generally known that the soldier is provided with rations to the amount of one pound of bread and three-quarters of a pound of meat per day. We purpose here to treat of the bread alone.

In the first place, it is only at such stations as Aldershot that the bread is made by the Commissariat Department. At out-stations, where the number of troops to be supplied is not great, bread is issued by contract. These contracts are made by the Commissariat with such stipulations as the following: That bread is not to be issued before twenty-four hours or later than thirty-six hours after baking, except the bread for prisons, which is not to be issued before thirty-six hours after baking—in order that the prisoners may have it stale. That the loaves are to weigh two pounds each when issued. Such contracts are made for six months; but they can be broken by giving one month's notice, or, in case of insolvency or bribery, immediately.

When, however, the number of troops in a station is considerable, the bread is made by the Commissariat. In the British army, bread is made entirely from wheat flour, which is much

the best for the purpose, as rye flour—the only other which contains gluten of a sufficiently adhesive nature to allow of the bread rising well—is dark in colour and bitter to the taste. The percentage of gluten varies according to the different kinds of wheat, the red or hard wheat containing considerably more than the soft or white wheat. Gluten is the substance in flour which forms the coating of the cavities in well-risen bread—that is to say, by holding the carbonic acid gas given off from the yeast or other ferment, the gluten causes the bread to rise. Gluten is the muscle-making property of bread, while the starch is the fat-forming portion. The best proportion of gluten for bread-making purposes is found to be from twelve to fifteen per cent.

Samples of every quantity of flour brought in are carefully examined before they are accepted. There are two qualities of flour used in the service: one quality called 'Seconds,' which is used for the ordinary ration bread; and another quality called 'Firsts,' which is used for the bread known as 'Hospital bread.' Hospital flour, or Firsts, should be white in colour; while the ration flour or Seconds has a yellowish tint.

Sometimes the flour brought in is adulterated with alum or copper, which are used to make old or fermented flour appear of good quality. Chalk and plaster of Paris are also sometimes used. The presence of these can be detected by simple chemical tests.

We may now presume that we have a supply of flour of good quality in the bakery, and also a store of malt. At this point the work of the Commissariat bakers usually begins, for, as the process of malt-making is lengthy, it is more convenient and as cheap to get it by contract. The first process is to make the yeast. For this purpose, hops are used, in order to prevent the yeast turning sour. Hops for the purpose of making yeast should be fresh; indeed, it is laid down in the contract that 'they shall be of this or last year's growth.'

The yeast most generally made use of in the service is what is known as 'Patent or Hop Yeast.' Taking one thousand pounds of flour as the amount which is to be made into bread, three gallons of this yeast is required, which is made in the following manner: Three pounds of crushed malt are steeped in soft water and heated up to a temperature of one hundred and seventy degrees in winter, or one hundred and forty-five degrees in summer. It is then well stirred up, covered over, and left to stand for an hour and a half. At the same time two ounces of hops are simmered in a caldron in four and a half gallons of water for an hour and a half at a temperature of two hundred degrees. At the end of this time the fire is withdrawn and the liquor allowed to cool down to one hundred and eighty degrees in winter, or one hundred and fifty-five degrees in summer, when it is strained through a sieve into the malt liquor. The two liquors are then well stirred, covered with a cloth, and left to stand for ten hours. At the end of that time the mixture is strained through a sieve into a clean tub; four ounces of sugar are laid on the sieve, and half a gallon of old yeast is poured through this into the mixture. It is then stirred again,

covered, and left to ferment for ten hours. During fermentation, a brown and white froth forms on the surface, and this should be removed.

Yeast is greatly affected by thunder, which turns it sour. To guard against this, in thundery weather it is covered up well, and iron rods are placed outside the tubs, to conduct away the electricity. If the yeast is affected, one pound of sugar is added to every seven gallons. It is usual when making yeast in thundery weather to add two ounces of ginger, which prevents it from being affected.

The next process is to make what is termed a 'sponge'—that is to say, a certain proportion of the flour to be made into bread is set aside in the trough and the yeast mixed with it. There are three sponges used—the quarter, half, and three-quarter sponges. Taking again one thousand pounds of flour as the amount to be converted into bread, two hundred and fifty, five hundred, or seven hundred and fifty pounds, according to the size of the sponge to be used, are set aside, and the whole three gallons of yeast are mixed with it. The yeast acts quicker upon the small quantity than on the large, and thus small sponges are used in winter, large sponges in summer.

The sponge being mixed, carbonic acid gas begins to form, and raises the sponge until it bursts through it, when it sinks down again. This is termed the 'first drop.' The same process is repeated, and we have the 'second drop.' The sponge is then broken up; nine to fifteen pounds of salt, dissolved in about fifty gallons of water, are added, and the remainder of the flour is gradually kneaded in. After the first kneading, which lasts about half an hour, the dough is left to stand for three or four hours, when it rises or 'gives proof.' It is then beaten down, kneaded again, and left to rise again for an hour. The dough is now taken out of the trough, placed on the moulding-table, cut up, and sealed. Allowance is made for loss of weight in and after baking, so that a two-pound loaf for issue the next day is sealed at two pounds three and a half ounces. On Saturdays, when baking is done for the following Monday as well as Sunday, the two-pound loaves for issue on Monday are sealed at two pounds five ounces. After sealing, the lumps are moulded, and left on the table for a little while to expand, which they do to about double their size. They are then placed in the oven and baked. When they are sufficiently baked—that is, when the crumb on pressure by the hand will spring back to its original position—they are withdrawn. The two-pound loaves require to be baked about an hour and a quarter. The bread is now carried from the bakehouse and stored in the storehouse. Next day, it is drawn out and placed in Commissariat wagons, in which it is taken round to the various regiments and issued according to the amount required by each regiment. Here, again, it is issued under regimental arrangements to the men; a two-pound loaf between two men for the day.

There are two kinds of ovens used in the Commissariat bakeries—the brick oven and the steam oven. In the first-named oven a fire is

made in communication with the interior. When the temperature within has reached five hundred and sixty degrees, the fire is removed and the bread placed in the oven. Between each batch of bread the heat of the oven has to be raised again. The time required for the first heating is three hours; for the subsequent heatings, one hour. The steam oven is heated from a furnace in rear by means of steam-pipes underneath. The proper temperature for this oven is four hundred and seventy degrees. This oven can be kept at the same temperature always; thus, as soon as one batch of bread is taken out, another one is put in. The time required to heat the oven in the first instance is five hours. The advantage of this oven over the brick one will be readily seen as regards time. But beyond this, the floor of the steam oven being of sheet-iron lasts much longer than the brick floor of the other. Thirdly, it requires less fuel, and consequently entails less expense.

As regards the management of a bakery, the bakers are classified according to the kind of work they do. They are all under the orders of the Master Baker, and work in such a manner and for such a time as may be necessary. The Master Baker superintends in the bakery, keeps an account of the materials expended, and is responsible for the correctness both in weight and quality of things which he receives. It is his duty at once to report any breach of contract. A foreman is in charge of each oven, and is responsible for any bread spoilt in his oven. The bread-store keeper has to keep an account of the bread produced by each foreman, and report to the Master Baker upon any which is burnt or badly baked. He is also responsible for the cleanliness of the bread-store and of the insides of the bread wagons.

#### J U M P E R A D A M S.

'THERE'LL be thunder and blazes in the diggin's when Peaceful Sam comes back an' finds 'is claim jumped,' observed Hairy Tom sagely to the crowd of loafers assembled in the bar of the 'Roaring Buster,' the first and by far the largest of the three public-houses that had sprung up like mushrooms at the recently discovered Merryberg gold-field; and, one and all, the listeners nodded their heads knowingly and agreed with the spokesman.

The first shock of astonishment had given way to a feeling of excitement, which pervaded the whole community, and became so intense that one by one the diggers had abandoned their work and collected in groups to discuss the situation and speculate upon the impending storm. Upon one man only had the general contagion apparently no effect; and yet, strange to say, he alone was the cause of the disturbance. When the others dropped their tools, he continued to hammer serenely away with his pick at the bank of the creek, humming the while a merry tune. No frown of anxiety creased his deep-bronzed brow, and no tremor of nervousness weakened the blows of his tool.

To describe the situation we must go back a little. When gold was first discovered at the Merryberg Fields, a month or two previously,

a 'rush,' in a small way, set in, and diggers from all parts of Queensland quickly congregated upon the scene like vultures round a carcass. In the first batch of arrivals was one Samuel Stoner, a big, hulking bully, with the strength of an ox, and the profanity of a carrier, who, on account of his fighting propensities, was facetiously dubbed 'Peaceful Sam,' a name which ever afterwards clung to him, and by which alone he soon came to be known. Having had some previous experience in prospecting, he was not slow in staking out the likeliest claim on the river and getting to work. Gold there was in his claim without a doubt, although at first he found no nuggets, and he worked at it like a nigger from early morning till late at night; and when he was on the work, there was nobody who could hold a pick with him. After two months of incessant toil, Peaceful Sam had amassed one hundred and sixty ounces of the precious metal. This would yield him something between five and six hundred pounds, quite sufficient to afford him a week's good spree, so a right royal spree he determined to have. Accordingly, he bought a horse, packed up his gold in a canvas bag, which he slung across the pommel of his saddle, and set out for Rockhampton, some sixty miles distant, with the avowed intention of banking his gold and then 'knocking down his cheque'—that is, the cheque would be handed whole to the landlord of some hotel or saloon, who would supply his guest and those whom he cared to treat with liquor until the amount was exhausted—or was supposed to be (which was not always the same thing).

In the meantime, Peaceful Sam had, by means of incessant bullying and the use of the most bloodthirsty threats, constituted himself a sort of 'cock of the walk,' and his name was a terror in the community; so much so, in fact, that upon leaving for Rockhampton, he not only made no provision for preserving the title to his claim, but openly dared anybody to appropriate, or 'jump' it, during his absence.

Upon the tenth day after he had left, a stranger appeared at Merryberg with a pick and shovel and very little else. The new-comer was a wiry but youthful-looking man, slightly below the middle height, whose beardless face made him perhaps appear younger than he really was. At the outside he could not have been more than thirty; but he had a shrewd look in his keen eyes, and a firm cut about the mouth and chin that spoke of indomitable pluck and set determination. He said his name was Adams. In a very business-like manner he proceeded at once to rig up a shanty, and the same night saw him housed beneath his own somewhat frail roof. The next morning he was stirring early, and, pipe in mouth, sauntered leisurely through the diggings. By-and-by he came to Peaceful Sam's vacant claim, and examined it with a critical eye, taking up a handful of soil and sifting it in his palm. Then he turned to the man who was working the next claim and inquired how it was that this one was vacant. The man, who happened to be none other than Hairy Tom, willingly supplied the asked-for information, and further descended at large upon the character of the late tenant, and the probable treatment anybody would receive who had the hardihood to jump the claim. Other diggers came up and corroborated his statements.

'What's the name o' this 'ere terror?' asked the young man coolly.

'Peaceful Sam.'

'Ain't he got another name?'

'Stoner, I b'lieve,' replied Hairy Tom.

'Well, then,' went on the intrepid Adams, 'when Mister Stoner comes back, 'e can start prospectin' agen. There's gold 'ere, an' Adams is goin' to work it. An' if Peaceful Sam works in this claim agen, 'e works for me.'

At these words the little knot of listeners stared at one another aghast, and then tried to dissuade the young man from carrying out his design. But all their efforts only served to strengthen his determination.

'E'll chaw yer up,' remarked Hairy Tom; 'he's twice as big as you. There ain't a man in the diggin's durst tackle 'im.'

'Then 'e'll find a pretty tough bit to chaw at,' replied Adams nonchalantly.

'Or, mebbe, 'e'll cleave yer skull with 'is shovel,' hazarded another.

To which the doughty Adams quietly responded: 'If 'e don't get 'is own split open first.—Look 'ere, now, mates! I've only got five pounds in the world; but I'll lay that wif any of yer, even money, that I stick to the claim; an' Peaceful Sam neither chaws me up nor splits my skull open; an' if you'll lay me two to one, I'll jump 'is bloomin' shanty too!'

The latter offer was quickly taken; Stoner's shanty was pointed out to the daring stranger, who at once took possession, after removing his few belongings to it, and then coolly and methodically set to work with pick and shovel in the deserted claim.

Eleven days had already passed since Peaceful Sam's departure to Rockhampton, and he might now be expected back at any hour. Just after sunset, that very night, when the bar of the 'Roaring Buster' was crammed with diggers, all still eagerly discussing the man they now referred to as 'Jumper' Adams, a bullock-wagon drove into the diggings and pulled up at the door of the public-house. At the front of the wagon sat Stoner, looking frightfully seedy and bilious. He had successfully knocked down his cheque, and had returned for another spell of work. As the bully entered the bar, an embarrassed hush fell upon the expectant crowd. Stoner looked from one to another inquiringly, but nobody cared to fire the train. Words of explanation hovered on the tip of many a tongue, but, reckless roughs as they were, they felt a sort of admiration for Jumper Adams's pluck, while at the same time they had no great love for Peaceful Sam, and each man was loth to set the bully at the interloper, although he knew that sooner or later the encounter must come off.

Stoner glanced savagely round, and then seizing a little man who stood near by the shoulder, fiercely demanded, embellishing his request with a few choice ornamental oaths: 'Wot's up? Out wi' it, yer flamin' crow-bait!'

'A stranger's come an' jumped yer claim,' the little man jerked out spasmodically.

Everybody waited breathlessly to hear the first explosion; but for a time everybody was disappointed. Never in all his chequered career had Peaceful Sam received such a staggerer as this. The shock was more than he was prepared

for. The bare idea of anybody daring to jump his claim! He could hardly grasp it, and he reeled back helplessly against the men who stood behind him. He even forgot to swear! The sight of the bully being so taken aback was so novel, that a broad grin appeared upon more than one swarthy visage, and an audible titter arose upon the outskirts of the crowd. Before Stoner could recover his composure, a voice from near the door piped out: 'An' 'e's jumped yer shanty too!'

The second shock was quite as severe as the first had been—if not more so—and for a few seconds Stoner glared vacantly around in silence. It was the ominous calm before the breaking of the storm, and ere any of the loafers volunteered any further intelligence, Peaceful Sam found his tongue and gave vent to a perfect avalanche of expletives. Never once did he falter; and in its way, his effort was a most finished performance.

'Where is the thieving snatcher, an' I'll go an' cut 'is liver out!' he roared passionately, with flashing eyes, bringing down his fist heavily on the counter.

'I seed 'im turnin' inter yer shanty when 'e knocked off work a bit since,' replied one.

Peaceful Sam made for the door, and emerged into the fast gathering night, showering curses around him, while the crowd followed close at his heels to witness the fun, and, if necessary, to prevent Jumper Adams from being killed outright.

Meanwhile, the object of the bully's wrath was peacefully unconscious of what was going on up at the 'Roaring Buster.' As the light began to fail, he had knocked off work for the day, and adjourned to the shanty, where he was now comfortably settled on an empty keg with a billy of tea and a damper before him. Calmly indifferent to the fate that was supposed to be hanging over him, he applied himself with keen appetite to the creature-comforts, and had almost emptied his billy, when the tramp of many feet broke in upon him through the bark walls of his shelter. Above the surging din of the advancing crowd he could distinctly hear the infuriated Stoner's sanguinary threats, and a curious smile played for a moment on Jumper Adams's shrewd features as he paused and listened intently. Then the smile faded, and he resumed his usual nonchalant air as he once more lifted the tin vessel to his lips and drained off the last drops from it. As he put down the empty billy on the cask that did duty for a table, the door of the shanty was burst suddenly open, and Peaceful Sam crossed the threshold, announcing his arrival with a specimen of his most belligerent oratory; while the diggers crowded round the door, hustling each other roughly in their eagerness to obtain a position from which they could watch the issue of events.

Apparently the curses had no effect upon Jumper Adams, for he quietly remained seated on his keg, and did not even take the trouble to raise his head until Stoner had advanced with clenched fist to the middle of the little room. Then—and not until then—did the lesser man, without rising, coolly turn his dark, determined eyes full on the bully, and very calmly and very deliberately he said: 'Sam Stoner, drop it! For close on five years I've followed your trail

from gold-field to gold-field and from rush to rush ; from Sandhurst to Ballarat, from Gympie to Charters Towers, and from Canoona to Merryberg. You know what there is between you and me ; and now I've come up with you, you can bet your soul and swag, you don't shake me off.'

Whether it was the speaker's words or the sight of his face that wrought the electrical change in Peaceful Sam's demeanour, the spectators could not determine ; but certain it was that the two shocks he had received at the 'Roaring Buster' were mere flea-bites to this. This was a clean knock-down blow, which instantaneously crushed every vestige of fight out of the braggart. His upraised fist fell listlessly by his side, his jaw dropped, and his eyes fairly bulged from his shallow cheeks as he stood for a second or two rooted to the spot before dropping limply on to a log that served for a seat. It was very evident that Jumper Adams stood in no danger either of being 'chawed up' or of having his skull split open. For a few minutes he kept his eyes steadily on the cowed bully ; then he turned to the spectators, and with a grim smile of satisfaction on his face, said : ' You can leave us now, mates ; there ain't goin' ter be no panterime performance to-night, an' Peaceful Sam an' me 'as a bit o' business to talk over together.'

So the mystified diggers returned to the 'Roaring Buster' to argue upon the inexplicable turn events had taken, leaving the discomfited Stoner and the triumphant Adams to enjoy each other's society undisturbed. What passed that night in the shanty nobody knew ; but soon after sunrise the following morning, Peaceful Sam, with a sullen frown on his face, was noticed to be at work in his old claim under the personal supervision of Jumper Adams, who did not forget, by the way, promptly to collect the amount of his wager. What was the nature of the influence that Adams exerted over the former bully—now bully no longer—none of the other diggers could find out, and very soon they gave up trying to. From that day the two worked steadily together, Stoner doing the digging and heavy work, while Adams attended to the washing and lighter jobs. There were no more sprees—no more cheques to be knocked down for Peaceful Sam, for his new master was a strict disciplinarian, and kept the big man's nose diligently to the grindstone. Early and late, week in and week out, the thud of the pick and the creak of the cradle could be heard issuing from Adams's claim, and regularly twice a month a consignment of gold was sent down to the bank at Rockhampton.

Soon it began to be whispered about the diggings that some big nuggets had been found in Adams's claim ; but how far the rumour was correct, Merryberg never knew, for the proprietor was singularly close upon business matters. Still, it was generally understood that he was making money fast, though how quickly was entirely a matter of conjecture. Perhaps Hairy Tom, who worked the adjoining claim, was the most competent of the outsiders to form an opinion, for he himself was doing remarkably well, although he was working single-handed, and his claim was, he judged, vastly inferior to his neighbour's.

As for Peaceful Sam, he at first submitted to the new arrangement with a very bad grace, and it was the unanimous opinion of the frequen-

ters of the 'Roaring Buster' that, had his task-master's hold upon him—whatever it was—been less powerful, he would speedily have kicked over the traces. By-and-by his sulky demeanour gave way to an air of hopeless resignation, which lasted for twelve months or so. At the end of that time he began to have occasional intervals of dismal cheerfulness, and once he was heard to laugh. It was a depressing, mournful sort of a laugh, it is true ; yet it was a laugh, and Merryberg marvelled. But Peaceful Sam's spirit was broken. He had lost that fluency of language that had at one time been the admiration of all who heard him, and his fame as a rowdy had long since sunk into oblivion.

But Jumper Adams never changed. He remained the same shrewd, level-headed fellow he was the first day he appeared upon the scene right up to the very day upon which he suddenly left Merryberg, dragging Peaceful Sam with him like a chained hound. Nobody but himself—and, perhaps, Stoner—was aware of his intentions ; and a few hours afterwards the news that he had sold his claim and left Merryberg for good came like a thunder-clap upon the diggings.

After another year of digging, and 'cradling' and 'panning-off,' the gold in Hairy Tom's claim suddenly gave out, and he, too, left Merryberg. Now Hairy Tom was by no means the unmitigated fool that the Australian gold-seeker generally develops into. Occasionally he had varied the tedium of constant digging with a few days' spree ; but he had never systematically knocked down his cheque whenever he had a hundred or two to his credit, and thus it happened that at the time his claim was played out he had a considerable balance lying in the bank at Rockhampton. With this he determined to quit the gold-fields and settle down. Of course his first thoughts turned to the Old Country, and nothing would do but he must come to England. Accordingly, he made his arrangements. A few weeks later the good ship *Calabar* landed him at Plymouth, and in due time the mail-train deposited him at Paddington.

In the course of his sight-seeing rambles about the metropolis he wandered as far as Rotten Row one bright afternoon in May, and stood watching the endless stream of gay equipages that flowed before him, bearing along the rank and fashion of London. He had not stood many minutes when his eyes suddenly became riveted upon a well-appointed landau, drawn by a pair of spirited grays, which was approaching. It was not the vehicle itself that attracted his attention, neither was it the well-matched grays. He had eyes only for the figure of a big man with a white hat, a light dust-coat, and a flaming scarlet tie, who occupied the greater portion of the principal seat—a man with the features of Peaceful Sam.

' Say, pard,' he began, familiarly digging a gentleman who stood near in the ribs, ' can you tell me whose that kerridge is ? '

' The one with the grays ? ' returned the gentleman good-humouredly.

' Yes.'

' That is Mr Stoner's, the wealthy Australian—or perhaps I ought to say *Mrs Stoner's*.'

' *Mrs Stoner's* ! ' repeated Hairy Tom.

' Yes—the lady in it.'

The vehicle being now quite close to where he

stood, Hairy Tom turned his attention to the second and only other occupant of it, whom he had not previously noticed, being too intent upon gazing at Peaceful Sam's familiar face. There was something about the lady which seemed strangely familiar to him, yet it did not at first occur to him where he had seen her before. He thought hard for a moment. Then a gleam of the truth broke in upon him, and he gave vent to a long low whistle as the carriage passed and disappeared in the crowd.

'You have seen Mrs Stoner before, eh?' queried the gentleman, watching him with an amused smile.

'Seed 'er afore?' he replied; 'well—yes, only the last time I seed 'er they didn't call 'er Mrs Stoner—she was Jumper Adams.'

#### G R E E K - F I R E .

THE comparatively modern invention of gunpowder has blown many of the appliances of ancient warfare from the battlefield, and among the discarded munitions Greek-fire takes a prominent place. A very high antiquity has been claimed for its invention, the period of the early wars between the Greeks and the Romans being pointed out by some writers as the true era of its discovery; but there are no authentic records of the use of the compound prior to the sieges of Constantinople in the seventh and eighth centuries, although some indications given by certain Assyrian bas-reliefs point to the use of liquid fire as a projectile at a period long antecedent to the Christian era. One of the early Fathers of the Church, too, gives instructions for the manufacture of a combustible substance, the main ingredients of which were resin, pitch, turpentine, sulphur, and the juice of the plant 'all-heal.'

It seems, however, that the true Greek-fire was invented in the year 678 by Callinicus, an architect of Heliopolis, in Syria, and that he afterwards deserted from the Calif and carried his secret and the art of its use to Constantinople, where for several centuries the method of compounding the fire was preserved, according to Gibbon, 'as the palladium of the state; the galleys and artillery might occasionally be lent to the allies of Rome, but the composition of the Greek-fire was concealed with the most jealous scruple, and the terror of the enemy was increased and prolonged by their ignorance and fright.' The secret was so carefully kept by the Eastern emperors that Constantine even devised misleading answers to be returned to any too inquisitive barbarian who might be tempted to ask inconvenient questions. 'They should be told that the mystery of the Greek-fire was revealed by an angel to the first and greatest of the Constantines, with the sacred injunction that this gift of Heaven—this peculiar blessing of the Romans, should never be communicated to any foreign nation; that the prince and the subject were alike bound to religious silence, under the temporal and spiritual penalties of treason and sacrilege; and that the infamous attempt would provoke the sudden and supernatural vengeance of the God of the Christians.' The historian adds that the secret was confined for above four hundred years to the Romans of the East, and that at the end of the eleventh century the Pisans, to whom every sea and every art were

familiar, suffered the effects, without understanding the composition of Greek-fire.

However true it may be that the secret was successfully preserved from the Romans of the Western Empire, it is certain that the Saracens contrived to obtain possession of the art of manufacturing this important munition of mediæval warfare at least as early as the commencement of the tenth century. We read that, at the siege of Thessalonica, which took place in 904, the Saracens cast liquid fire by means of tubes upon the wooden fortifications of the city, and by thus destroying the defences succeeded in capturing the town. The black clays of Media and Persia probably supplied these pioneers of the faith of Islam with the principal constituents of the compound used.

The celebrated Englishman, Friar Bacon, who lived so many years in advance of his generation, and who is credited with several discoveries which have proved of inestimable value to succeeding ages, is supposed to have concealed his real knowledge of the composition of Greek-fire under the mask of an assumed ignorance, and to have returned anagrammatic answers to questions addressed to him upon the subject. He gives sulphur and saltpetre as two of the components of Greek-fire, and it is stated that a third is to be detected in the logograph, 'Lurn vopo vir Can utriel.' The words 'urit voraciter' can be extracted from the anagram with little difficulty, but the interpretation of the remaining portion has baffled ingenuity.

Giambattista Porta says: 'Greek-fire is made by boiling willow-charcoal, salt, ardent aqua vita, sulphur, pitch, frankincense, threads of soft Ethiopian wool, and camphor.' The Princess Anna, daughter and historian of the Emperor Alexius Comnenus, states that Greek-fire was compounded of sulphur, resin, and oil. It has, however, been maintained by many writers, both ancient and modern, that naphtha or liquid bitumen was the principal ingredient of the fire. It is possible, therefore, that the oil mentioned by Anna Comnena, whose ample opportunities of obtaining reliable information must have insured her from the possibility of a mistake, was actually naphtha, and not one of the animal or vegetable oils then used for illuminating purposes, especially as the use of naphtha in lamps is a practice of very ancient date. 'Naphtha,' writes Gibbon, 'was mingled, I know not in what proportions, with sulphur, and with the pitch that is extracted from evergreen firs—that is, resin—in forming Greek-fire.'

According to the author of *L'Esprit des Croisades*, the fire was compounded of the gum of the fir, pine, and other resinous trees, with the addition of brimstone and naphtha and other bituminous substances. Fanciful materials were sometimes included in its composition by those ignorant of its real nature. The water of a particular but unnamed fountain in the East, and duck's grease, are among these imaginary ingredients.

The liquid was used in various ways in the warfare of the times. Sometimes it was poured from ladles or caldrons upon the besiegers, or, enclosed in vessels of some brittle substance, was thrown into the ranks of the enemy by means of machines devised for the purpose. But frequently

the heavy ballista and other military engines used in early times for throwing missiles into besieged cities were pressed into service for scattering this destructive compound in large quantities—masses of the size of a barrel being sometimes propelled. 'It was either,' says the writer already quoted, 'poured from the ramparts in large boilers, or launched in red-hot balls of stone and iron, or darted in arrows and javelins, twisted round with flax and tow which had deeply imbibed the inflammable oil.' But usually it was vomited forth through long copper tubes from the mouths of fantastic figures, shaped to resemble the heads and jaws of savage animals, and set in the prows of ships, and by means of suitable engines it could be propelled to a considerable distance.

As long as Greek-fire was kept from the air it could be stored with little danger; but when poured out, it ignited with loud explosions, and vast volumes of thick black smoke issued from it. Owing to its viscid nature, it adhered to whatever it touched, and burned with an intense flame, which water not only failed to quench, but appeared to endow with more intense fury. Sea-water is particularly mentioned as intensifying its inflammability, and causing it to burn with doubled energy. It could only be put out by the use of large quantities of sand, vinegar, or earth, or by a very singular mixture, and one not likely to be met with.

The Saracens encountered the onslaughts of the crusading hosts by a free use of Greek-fire. The knights little feared the arrows and scimitars of their infidel opponents, but they retired aghast at the unearthly noise and hideous aspect of the mysterious enemy, of which we read in the *Memoirs of Joinville* that 'it came flying through the air like a long-tailed winged dragon, about the thickness of a hogshead, with the report of thunder and the velocity of lightning; and the darkness of the night was dispelled by this deadly illumination.'

Greek-fire has been known under various names in different times and countries. Procopius calls it 'Medea's oil.' Cinnamus, who wrote in the twelfth century, mentions it under the name of 'Median fire.' The Romans knew it as 'oleum incendiarium.' French writers refer to it as 'feu grégeois,' and the Chinese call it 'oil of cruel fire.' It has also been spoken of as 'wild-fire,' 'maritime fire,' 'wet-fire,' and 'fire-rain.'

In the year 1755 two Frenchmen, Gaubert and Dupré, are reported to have rediscovered the art of manufacturing Greek-fire; but as the Government prohibited them from making the nature of the composition known, their secret appears to have died with them. Niepce experimented in more recent times, and found through his investigations that a mixture of benzol and potassium in the proportion of six hundred to one exhibited many of the properties of the ancient composition.

Greek-fire was undoubtedly the most formidable material of war known to the middle ages, though its employment would seem to have been confined to Eastern Europe and Asia Minor; but after the discovery of gunpowder we hear little of its use as an engine of destruction, and the best authorities agree that Greek-fire is unsuited for employment in modern warfare. An attempt, indeed, was made in the American Civil War to revive its

use, and fire-shells, containing saltpetre, sulphur, coal-tar, and naphtha, were thrown, by means of cannon, into Charleston by General Gilmore from a distance of four miles, but it appears very improbable that 'the most villainous compound ever used in war,' as the disgusted Confederate, Beauregard, called it, will ever again be employed as a destructive agent.

#### BRONZE AGE TRUMPETS.

In the Danish National Museum, the trumpets from the Bronze Age have always attracted particular attention on account of their size, graceful shape, and tasteful ornamentation. They have only been found in morasses (peat-bogs), never in mounds; and, what has specially struck antiquaries, always in pairs. It has therefore been considered probable that the trumpets, for the purposes of harmony, had been used in pairs, which may also have been the case with the six trumpets (three pairs) which were found at the beginning of the century in a bog near Hillerød, island of Zealand, Denmark. They were tried at that time, just to prove that instruments many thousands of years old could give out sounds; and this was thought sufficient. Connoisseurs examined them carefully all over, their casting, ornamentation, the position of their finding, and in every way which could interest an antiquary. A musician, Dr A. Hammerich, took up the matter, and instituted number of experiments by getting clever performers to play on them. The shape of the mouthpiece—the taper form, so carefully preserved throughout—the smooth inside—the dimensions of the tube, which have so much influence on the intonation—all prove a considerable knowledge of acoustics on the part of the makers, and that to get lower tones they had to increase the size of the instruments. As the trumpets must be over two thousand years old, this is a remarkable contribution to the history of music; and that such ancient instruments can to-day be used in their original compass, throws a characteristic light over our Bronze Age, speaking highly for the intellectual culture which must have existed during that age in Denmark.

#### WAITING.

BELOVED, in some dewy summer night,  
Across the sapphire sea, the dusky sands,  
Across the wind-fanned, ripening meadow-lands,  
Fair June will come in shining robes bedight.  
The amorous East will flush and flame with light  
To welcome her. Set in the gleaming strands  
Of her gold hair are roses: in her hands  
She holdeth glistening lilies, cool and white.  
Oh, warmer than the welcome the dawn skies  
Give rose-crowned June, my welcoming shall be  
For thee when thou wilt come. Dear love, I wait  
In darkness weird, and cold, and desolate;  
Yearning for that glad hour when I shall see  
Thy sweet face with its love-lit, downcast eyes.

ALICE FURLONG.

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